CLAIMS

1. A method of analyzing operating characteristics of a motor actuated system comprising the steps of:

sensing a current drawn by a motor to obtain a current waveform;

identifying oscillations in the current waveform caused by segment switching;

determining a number of oscillations corresponding to one rotation of the motor; and

normalizing the current waveform to one rotation of the motor to define a normalized waveform in the spatial domain.

2. The method of claim 1 wherein the step of normalizing the current waveform comprises selecting a predetermined number of regularly spaced data points for one rotation of the motor, such that each rotation of the motor is defined by the selected predetermined number of data points.

3. The method of claim 2 wherein the step of normalizing further comprises interpolating the current waveform to determine a value for each of the data points, each rotation of the motor being defined by the same number of regularly spaced data points.

4. The method of claim 1 wherein the step of identifying oscillations comprises filtering the current waveform to define a filtered waveform.

5. The method of claim 1 including the step of performing a frequency analysis on the normalized waveform.

6. The method of claim 5 wherein the frequency analysis comprises calculating a frequency dependent distribution of the normalized waveform to determine the relative energy distribution of the waveform.

7. The method of claim 6 wherein the frequency analysis further comprises identifying frequencies associated with components of the system and evaluating the energy content of the waveform at the identified frequencies.

8. The method of claim 6 wherein the frequency dependent distribution comprises a power-spectral-density of the normalized waveform.

9. The method of claim 5 wherein the frequency analysis is performed over the entire normalized waveform comprising multiple rotations of the motor.

10. The method of claim 5 wherein the normalized waveform is divided into discrete overlapping parts, and the frequency analysis is performed on each part of the normalized waveform.

11. The method of claim 5 wherein the frequency analysis comprises identifying system characteristics corresponding to identifiable rotational positions of the motor.

12. A method of analyzing operating characteristics of a motor actuated system comprising the steps of:

sensing a current drawn by a motor to obtain a current waveform;

identifying a characteristic in the current waveform corresponding to a predetermined change of position of the motor; and

normalizing the current waveform to the spatial change of position of the motor to define a normalized waveform in the spatial domain.

13. The method of claim 12 wherein the step of normalizing the current waveform comprises selecting a predetermined number of regularly spaced data points corresponding to the predetermined change of position of the motor, such that each predetermined change of position of the motor is defined by a set of the selected predetermined number of data points.

14. The method of claim 13 including the step of performing a frequency analysis on the sets of the selected predetermined number of data points.

15. The method of claim 14 wherein the change of position of the motor comprises a rotation of the motor whereby the frequency analysis is described with reference to rotations of the motor.

16. The method of claim 13 wherein the normalized waveform is divided into discrete parts corresponding to positions of a first component of the system, and including the step of using the frequency analysis to identify at least one defect of a second component of the system based on a frequency analysis performed on the discrete parts of the normalized waveform.